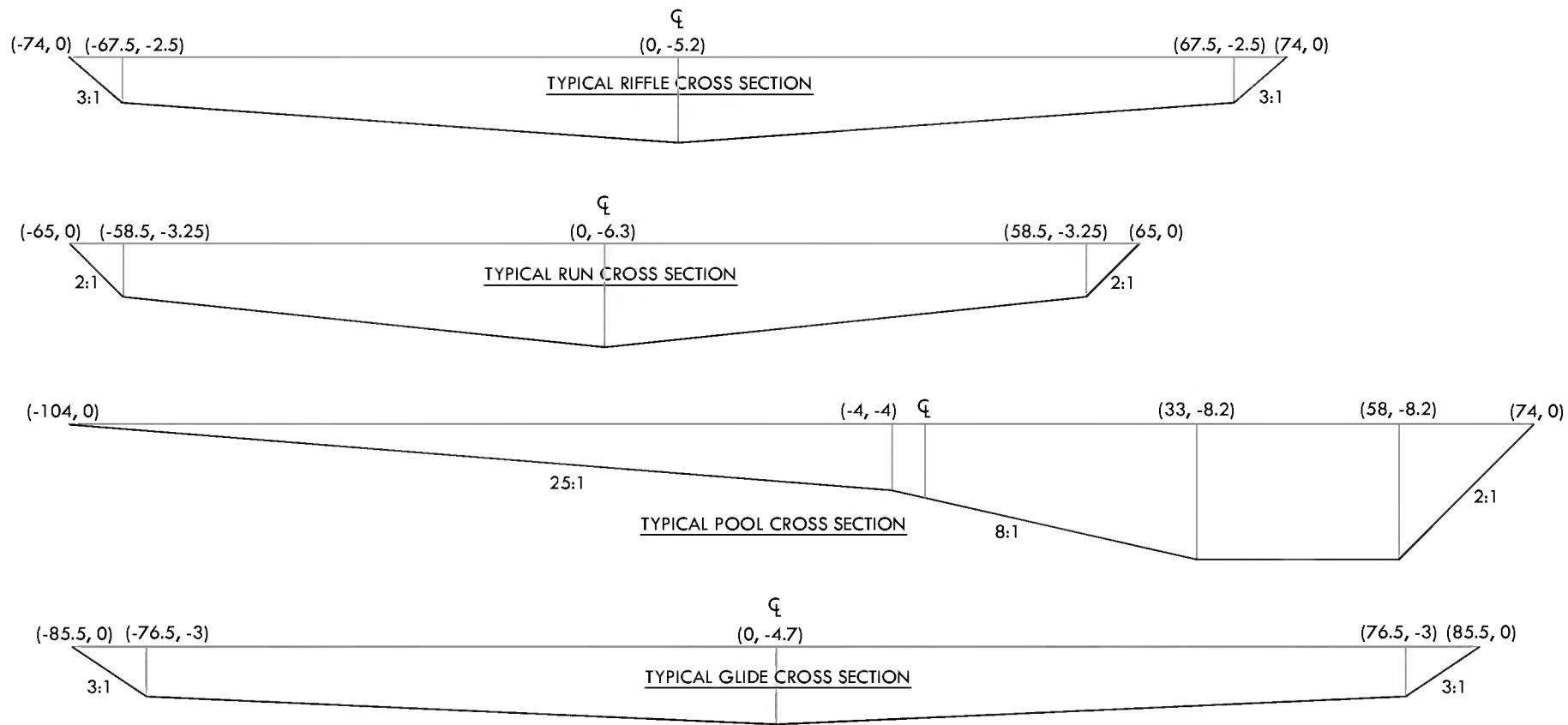
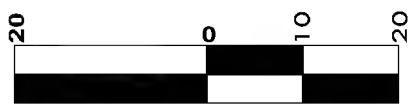


CFR3



| BANKFULL CHANNEL DESIGN DIMENSIONS CFR3 | | | | |
|--|-------------|------------|------------|------------|
| PARAMETER FEATURE | POOL | RIFFLE | RUN | GLIDE |
| DISCHARGE | 3200 cfs | 3200 cfs | 3200 cfs | 3200 cfs |
| WIDTH | 163-193 ft | 141-156 ft | 120-142 ft | 162-179 ft |
| MEAN DEPTH | 2.9-3.4 ft | 3.5-3.9 ft | 4.1-4.8 ft | 3.5-3.9 ft |
| MAX. DEPTH | 7.4-11.1 ft | 4.7-5.7 ft | 5.9-6.7 ft | 4.2-5.1 ft |
| SCOUR DEPTH | 13 ft | 5.9 ft | 7.4 ft | 5.3 ft |
| XS AREA | 688 sq ft | 550 sq ft | 578 sq ft | 605 sq ft |
| WIDTH:DEPTH | N/A | 36-44 | 25-35 | 42-51 |

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



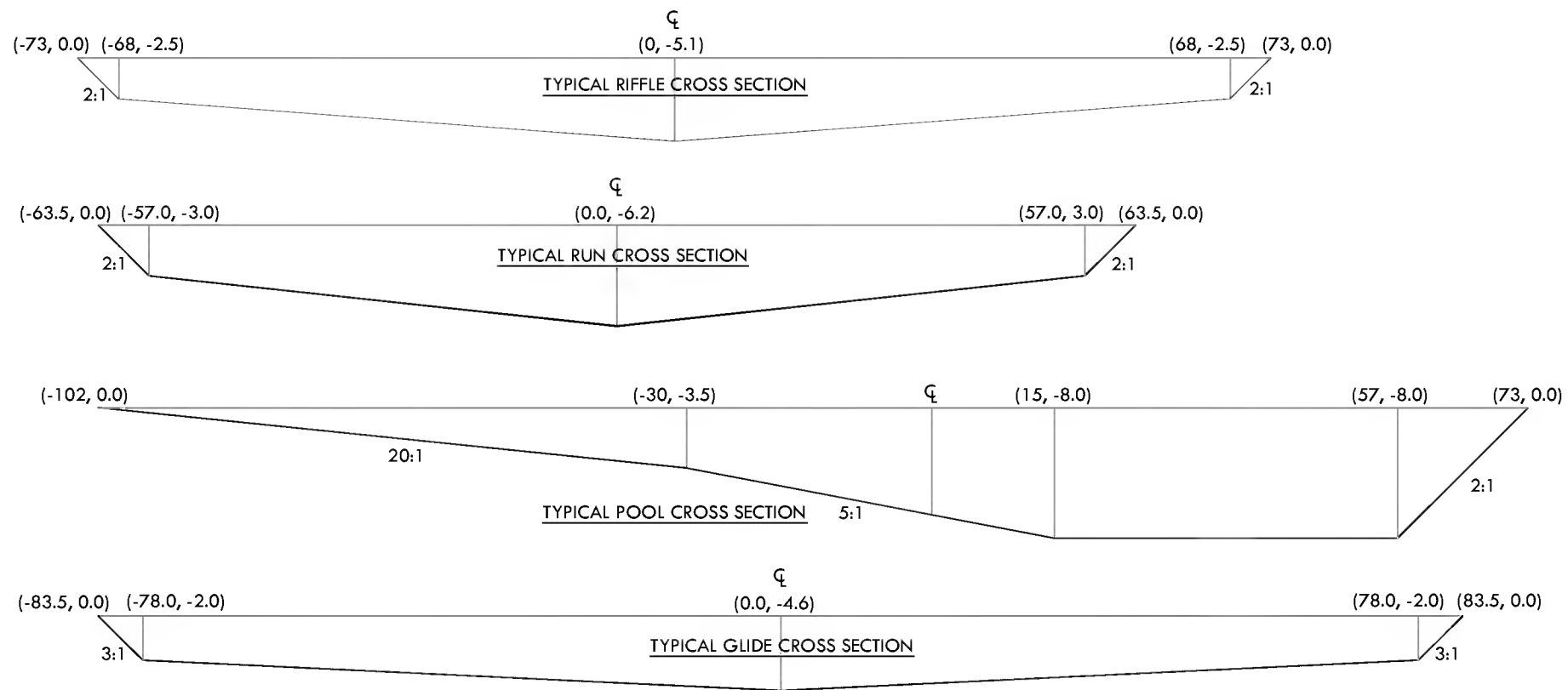
River Design Group, Inc.
P.O. Box 1722
Whitefish, MT 59937
tel: (406) 862-4927
fax: (406) 862-4963
www.riverdesigngroup.net



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| 2 | 10-15-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

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|--------------|------------|---------------|--|
| DRAWN BY: | NMW | SHEET K-1 | |
| DESIGNED BY: | GTD/MSD | | |
| CHECKED BY: | MSD | FILE NAME: | |
| PROJECT NO.: | RDG-04-018 | RDG-11X17.dwg | |

CFR 2



| BANKFULL CHANNEL DESIGN DIMENSIONS CFR 2 | | | | |
|---|-------------|------------|------------|------------|
| PARAMETER FEATURE | POOL | RIFFLE | RUN | GLIDE |
| DISCHARGE | 3200 cfs | 3200 cfs | 3200 cfs | 3200 cfs |
| WIDTH | 160-189 ft | 138-153 ft | 118-139 ft | 159-176 ft |
| MEAN DEPTH | 2.8-3.3 ft | 3.5-3.8 ft | 4.0-4.7 ft | 3.5-3.8 ft |
| MAX. DEPTH | 7.3-10.9 ft | 4.6-5.6 ft | 5.8-6.6 ft | 4.1-5.0 ft |
| SCOUR DEPTH | 12.7 ft | 5.8 ft | 7.3 ft | 5.2 ft |
| XS AREA | 795 sq ft | 530 sq ft | 557 sq ft | 583 sq ft |
| WIDTH:DEPTH | N/A | 36-44 | 25-35 | 42-50 |

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348

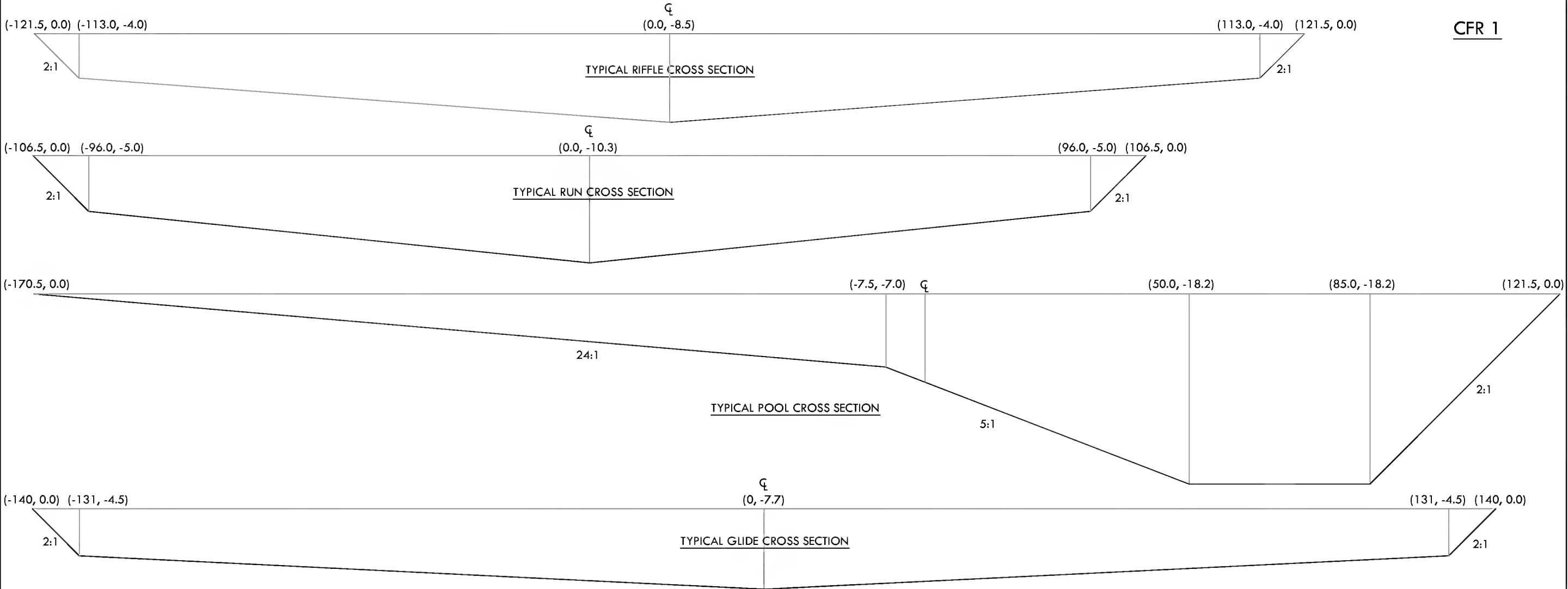


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| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

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|--------------|------------|---------------|--|
| DRAWN BY: | NMW | SHEET K-2 | |
| DESIGNED BY: | GTD/MSD | | |
| CHECKED BY: | MSD | FILE NAME: | |
| PROJECT NO.: | RDG-04-018 | RDG-11X17.dwg | |



| BANKFULL CHANNEL DESIGN DIMENSIONS CFR 1 | | | | |
|---|--------------|------------|-------------|------------|
| PARAMETER FEATURE | POOL | RIFFLE | RUN | GLIDE |
| DISCHARGE | 10400 cfs | 10400 cfs | 10400 cfs | 10400 cfs |
| WIDTH | 268-316 ft | 231-255 ft | 197-232 ft | 265-293 ft |
| MEAN DEPTH | 4.7-5.5 ft | 5.8-6.4 ft | 6.7-7.9 ft | 5.8-6.4 ft |
| MAX. DEPTH | 12.2-24.3 ft | 8.3-8.7 ft | 9.7-10.9 ft | 7.5-7.8 ft |
| SCOUR DEPTH | 24.3 ft | 9.1 ft | 12.2 ft | 8.2 ft |
| XS AREA | 2220 sq ft | 1480 sq ft | 1554 sq ft | 1628 sq ft |
| WIDTH:DEPTH | N/A | 36-44 | 25-35 | 41-51 |

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull

2000

0

10

20

SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

DRAWN BY: NMW

DESIGNED BY: GTD/MSD

CHECKED BY: MSD


PROJECT NO.: RDG-04-018

SHEET K-3


FILE NAME: RDG-11X17.dwg

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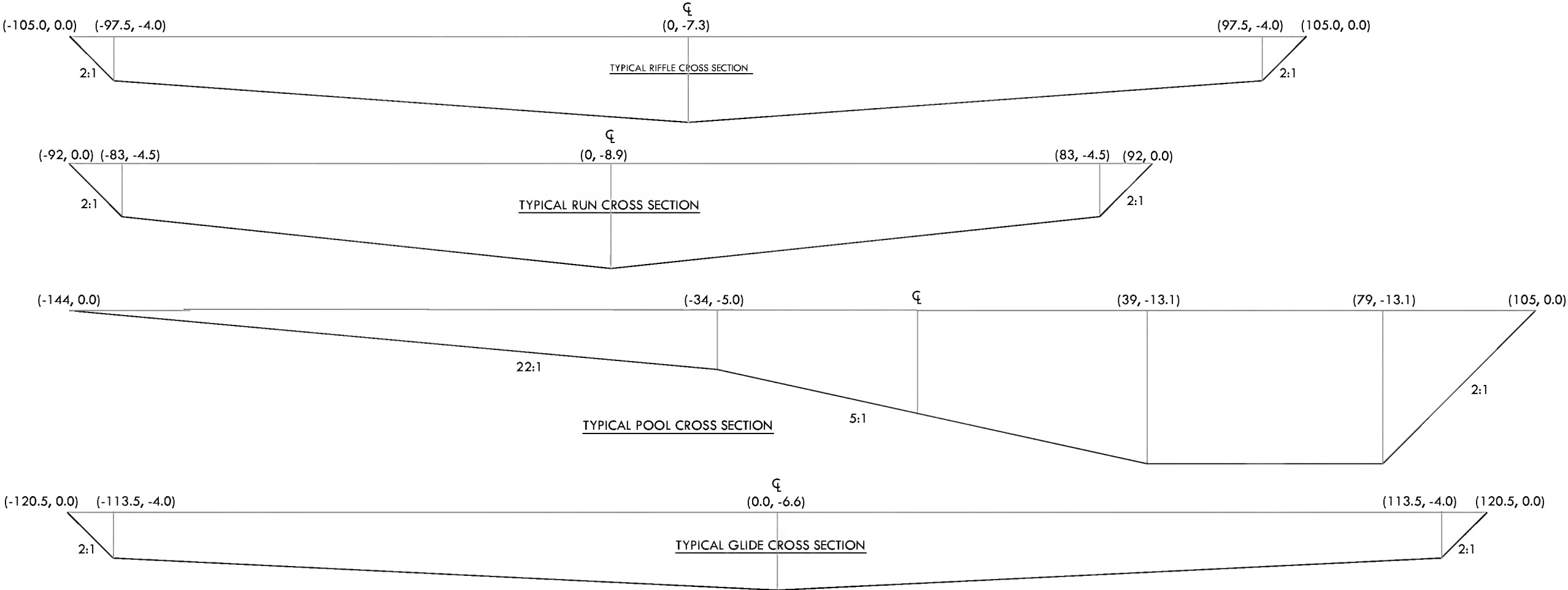
WestWater Consultants, Inc.



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| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

CFR 1 - Right Channel @ Island Below Dam



| BANKFULL CHANNEL DESIGN DIMENSIONS CFR 1 Right Channel @ Island Below Dam | | | | |
|--|--------------|------------|------------|------------|
| PARAMETER FEATURE | POOL | RIFFLE | RUN | GLIDE |
| DISCHARGE | 10400 cfs | 10400 cfs | 10400 cfs | 10400 cfs |
| WIDTH | 231-273 ft | 199-220 ft | 169-200 ft | 229-253 ft |
| MEAN DEPTH | 4.0-4.8 ft | 5.0-5.5 ft | 5.8-6.8 ft | 5.0-5.5 ft |
| MAX. DEPTH | 10.5-15.7 ft | 7.2-7.5 ft | 8.4-9.4 ft | 6.5-6.8 ft |
| SCOUR DEPTH | 18.4 ft | 7.9 ft | 10.5 ft | 7.1 ft |
| XS AREA | 1650 sq ft | 1100 sq ft | 1155 sq ft | 1210 sq ft |
| WIDTH:DEPTH | N/A | 36-44 | 25-35 | 42-51 |

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



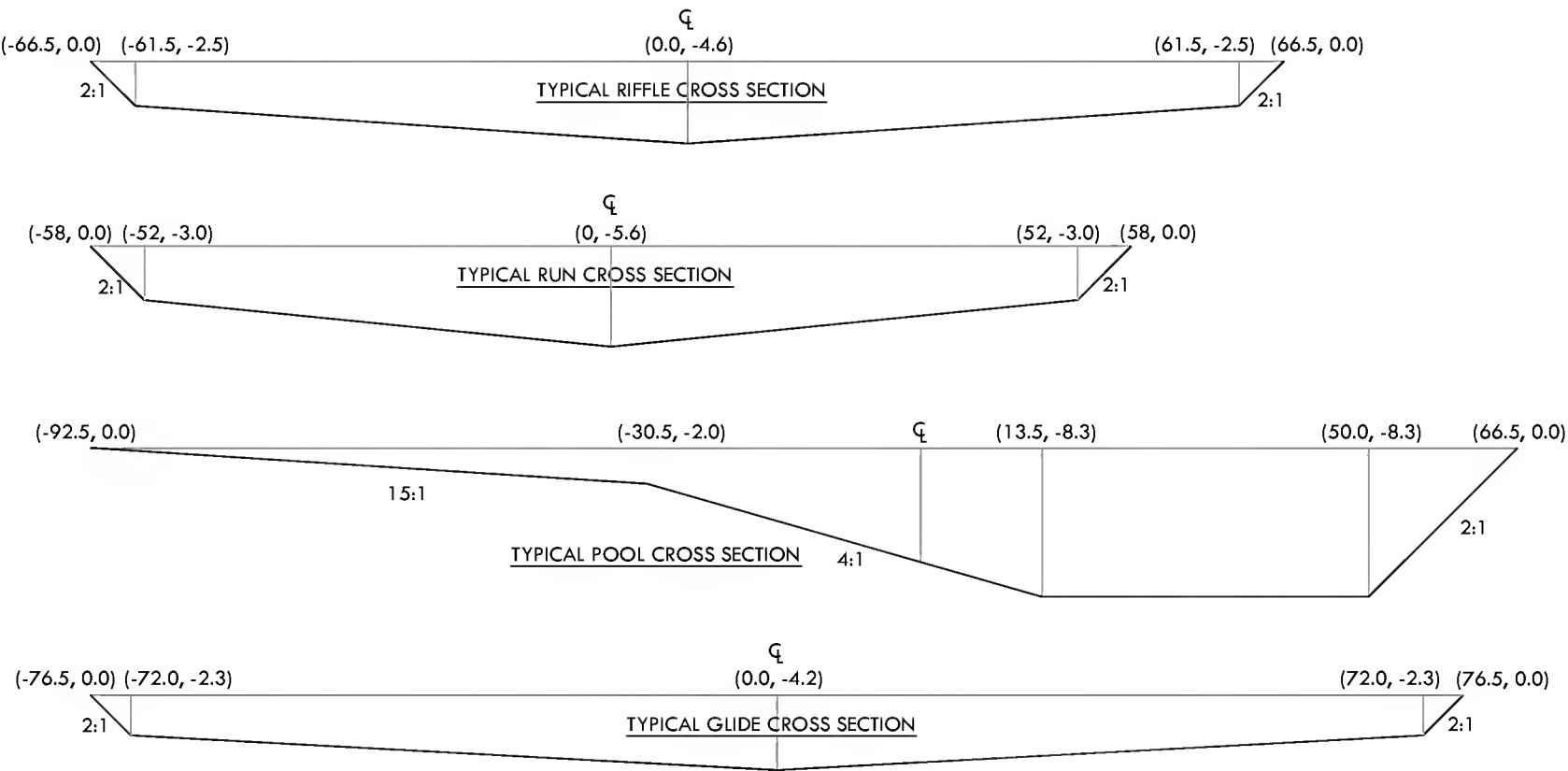
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| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

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|--------------|------------|---------------|--|
| DRAWN BY: | NMW | SHEET K-4 | |
| DESIGNED BY: | GTD/MSD | | |
| CHECKED BY: | MSD | FILE NAME: | |
| PROJECT NO.: | RDG-04-018 | RDG-11X17.dwg | |

CFR 1 - Left Channel @ Island Below Dam



| BANKFULL CHANNEL DESIGN DIMENSIONS CFR 1 - Left Channel @ Island Below Dam | | | | |
|---|------------|------------|------------|------------|
| PARAMETER FEATURE | POOL | RIFFLE | RUN | GLIDE |
| DISCHARGE | 10400 cfs | 10400 cfs | 10400 cfs | 10400 cfs |
| WIDTH | 146-172 ft | 126-139 ft | 107-127 ft | 145-160 ft |
| MEAN DEPTH | 2.6-3.0 ft | 3.2-3.5 ft | 3.6-4.3 ft | 3.2-3.5 ft |
| MAX. DEPTH | 6.6-9.9 ft | 4.5-4.7 ft | 5.3-6.0 ft | 4.1-4.3 ft |
| SCOUR DEPTH | 11.6 ft | 5.0 ft | 6.6 ft | 4.5 ft |
| XS AREA | 660 sq ft | 440 sq ft | 462 sq ft | 484 sq ft |
| WIDTH:DEPTH | N/A | 36-44 | 25-35 | 41-50 |

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

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1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



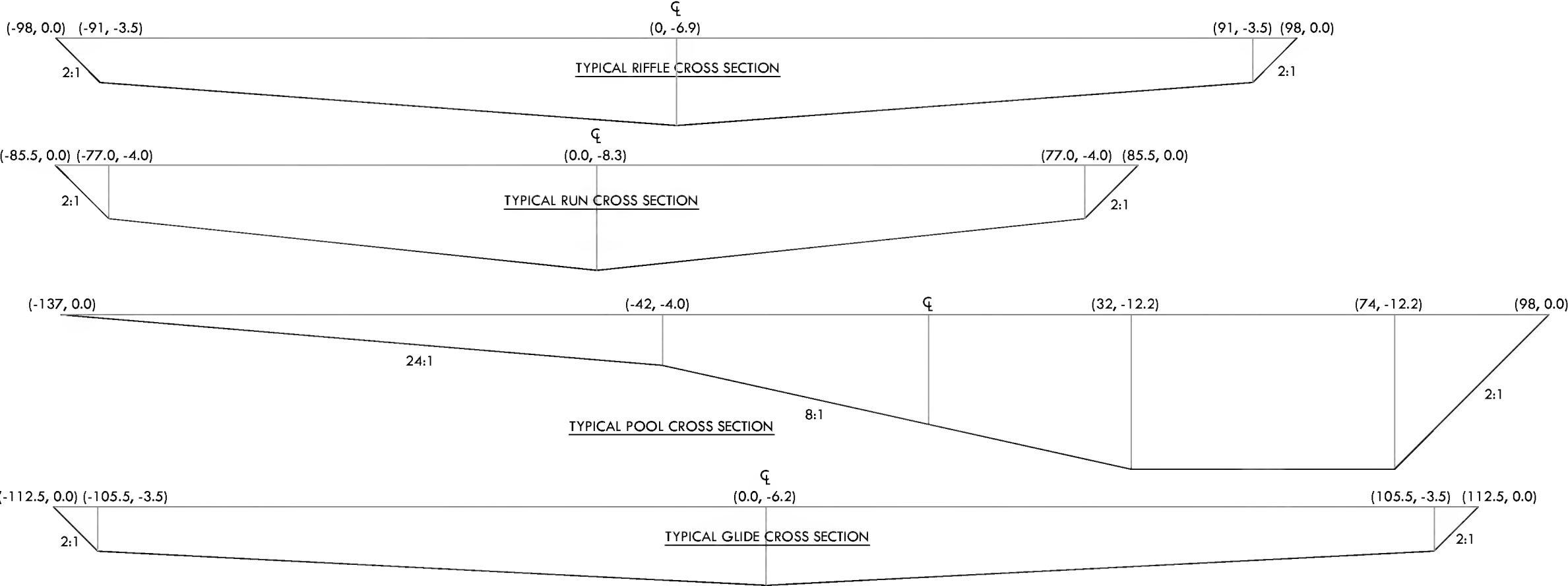
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| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

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| DRAWN BY: | NMW | SHEET K-5 | |
| DESIGNED BY: | GTD/MSD | | |
| CHECKED BY: | MSD | FILE NAME: | |
| PROJECT NO.: | RDG-04-018 | RDG-11X17.dwg | |

BFR 1



| BANKFULL CHANNEL DESIGN DIMENSIONS BFR 1 | | | | |
|---|-------------|------------|------------|------------|
| PARAMETER FEATURE | POOL | RIFFLE | RUN | GLIDE |
| DISCHARGE | 6200 cfs | 6200 cfs | 6200 cfs | 6200 cfs |
| WIDTH | 216-255 ft | 186-206 ft | 158-187 ft | 214-236 ft |
| MEAN DEPTH | 3.8-4.5 ft | 4.7-5.2 ft | 5.4-6.4 ft | 4.7-5.2 ft |
| MAX. DEPTH | 9.8-14.7 ft | 6.2-7.5 ft | 7.8-8.8 ft | 5.6-6.7 ft |
| SCOUR DEPTH | 17.1 ft | 7.8 ft | 9.8 ft | 7.1 ft |
| XS AREA | 1440 sq ft | 960 sq ft | 1008 sq ft | 1056 sq ft |
| WIDTH:DEPTH | N/A | 36-44 | 25-35 | 41-50 |

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

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Corvallis, MT 59828
tel: (406) 961-3348



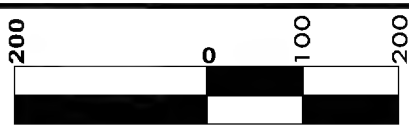
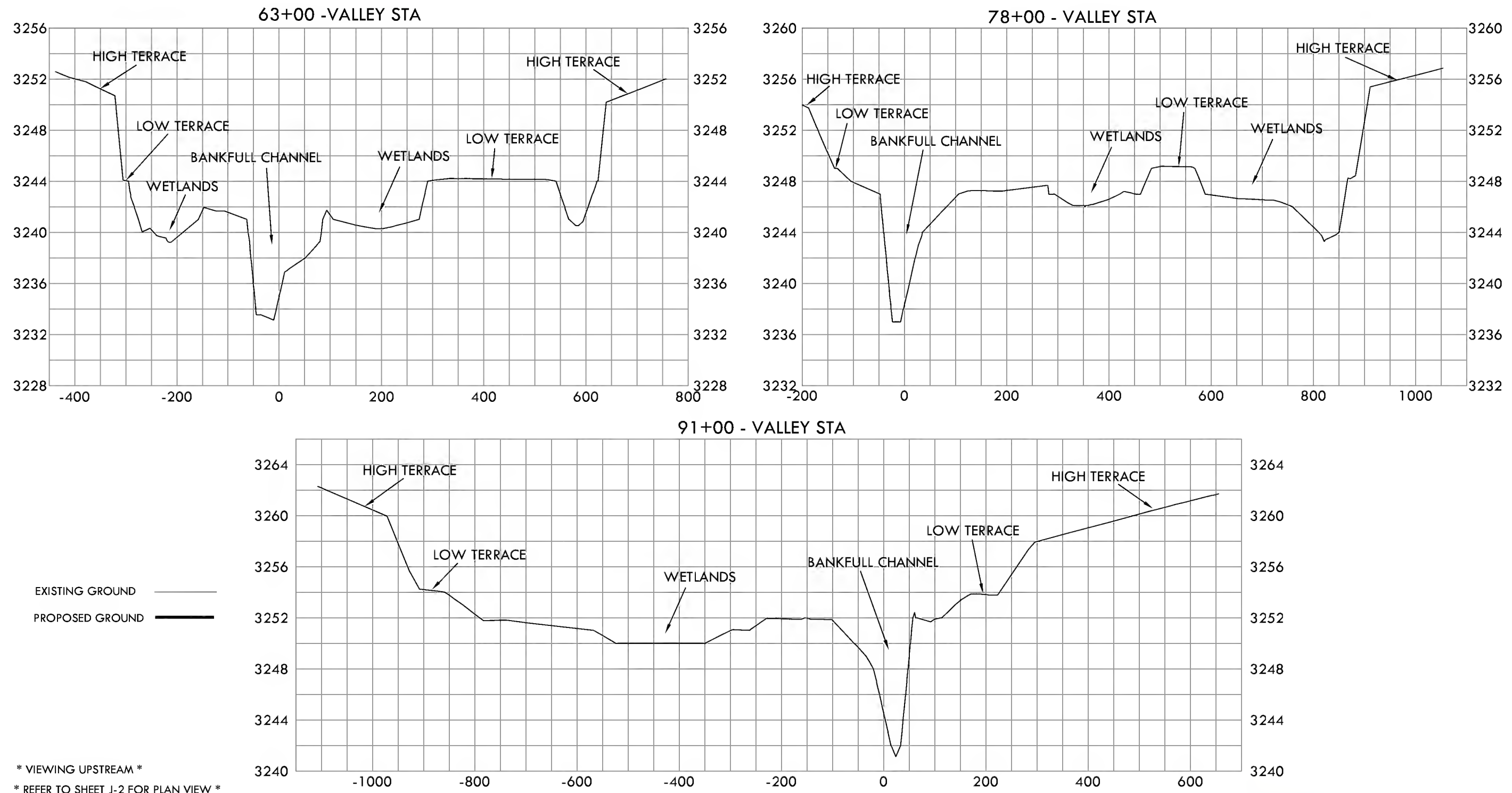
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DESIGNED BY: GTD/MSD
CHECKED BY: MSD
PROJECT NO.: RDG-04-018

SHEET
K-6
FILE NAME:
RDG-11X17.dwg

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| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |



SCALE: 1" = 200' H
SCALE: 1" = 8' V

CFR 2 - VALLEY CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



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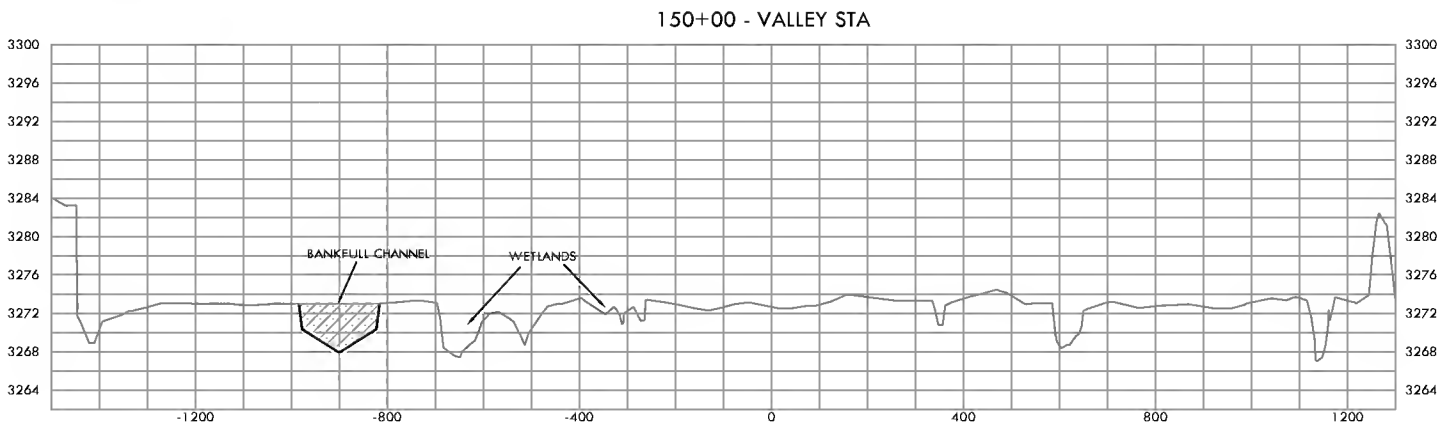
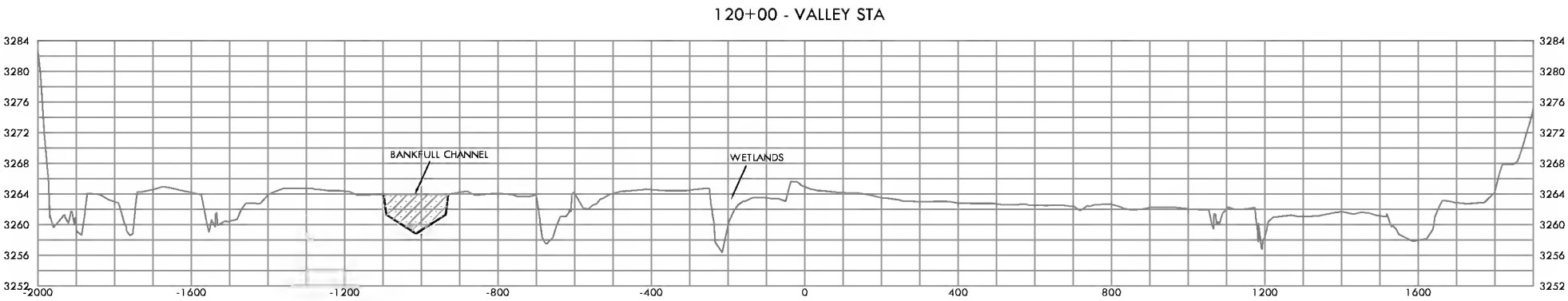
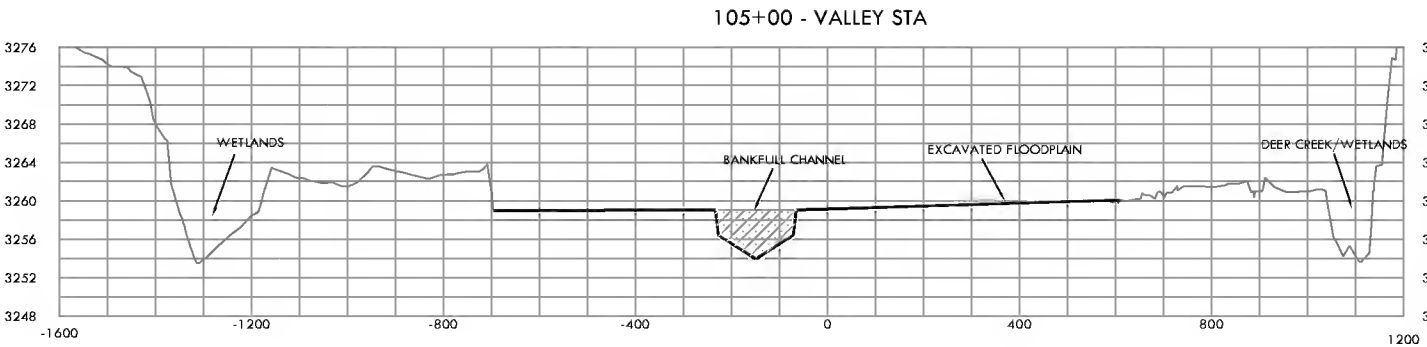
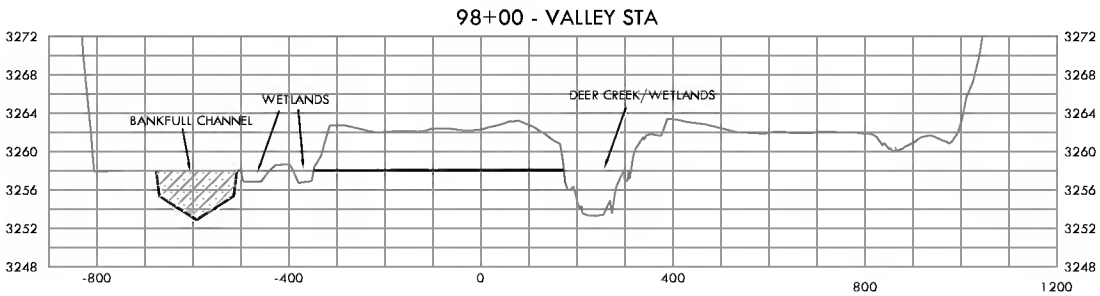


| 2 | 10-14-05 | KLC | FINAL |
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| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

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| DRAWN BY: | NMW |
| DESIGNED BY: | GTD/MSD |
| CHECKED BY: | MSD |
| PROJECT NO.: | RDG-04-018 |

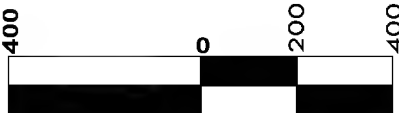
SHEET K-7

FILE NAME:
RDG-11X17.dwg



EXISTING GROUND ———
PROPOSED GROUND ———

* VIEWING UPSTREAM *
* REFER TO SHEET J-2 & J-3 FOR PLAN VIEW *



SCALE: 1" = 400' H
SCALE: 1" = 20' V

CFR 3 - VALLEY CROSS SECTIONS

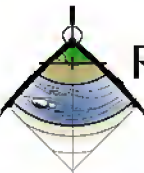
RESTORATION PLAN

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1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



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River Design Group, Inc.
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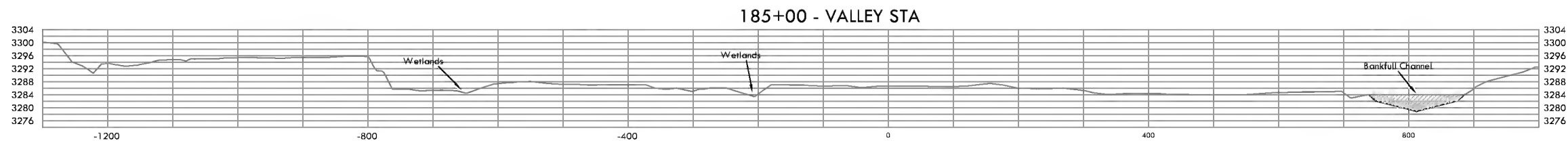
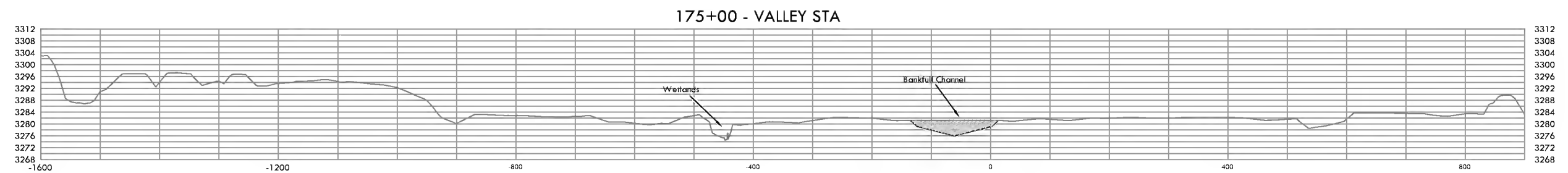
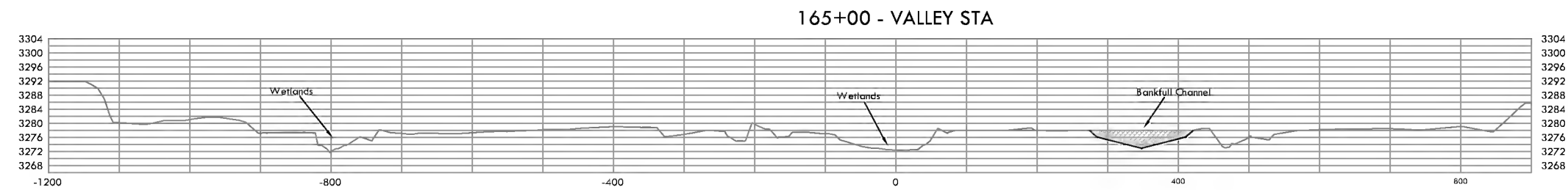


RIVER
DESIGN
GROUP, INC.

| NO. | DATE | BY | REVISION DESCRIPTION |
|-----|----------|-----|----------------------|
| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |

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| DRAWN BY: | NMW |
| DESIGNED BY: | GTD/MSD |
| CHECKED BY: | MSD |
| PROJECT NO.: | RDG-04-018 |

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| FILE NAME: RDG-11X17.dwg |

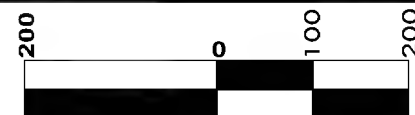


EXISTING GROUND _____

PROPOSED GROUND _____

* VIEWING UPSTREAM *

* REFER TO SHEET J-3 FOR PLAN VIEW *



SCALE: 1" = 200' H
SCALE: 1" = 40' V

CFR 3 - VALLEY CROSS SECTIONS

RESTORATION PLAN

DRAWN BY: NMW
DESIGNED BY: GTD/MSD
CHECKED BY: MSD
PROJECT NO.: RDG-04-018

**SHEET
K-9**

FILE NAME:
RDG-11X17.dwg

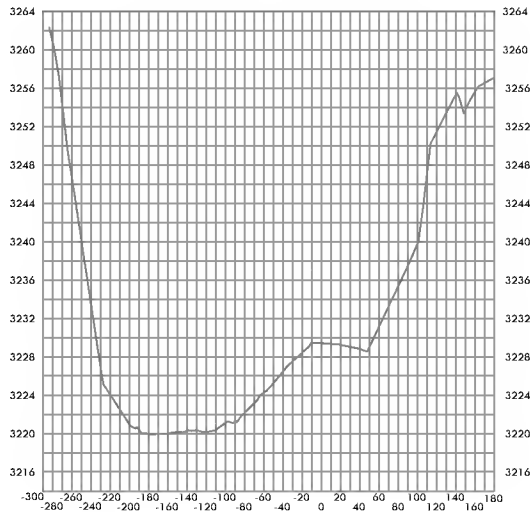
WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



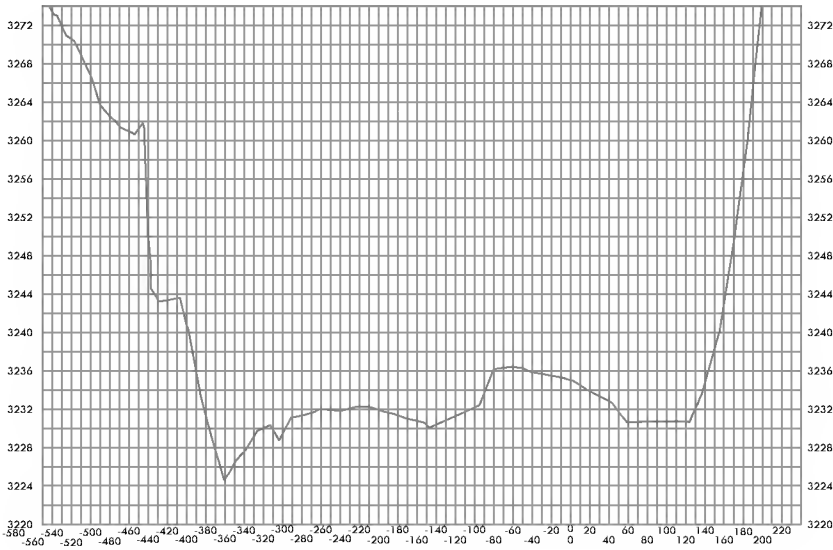
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27+00 - VALLEY STA



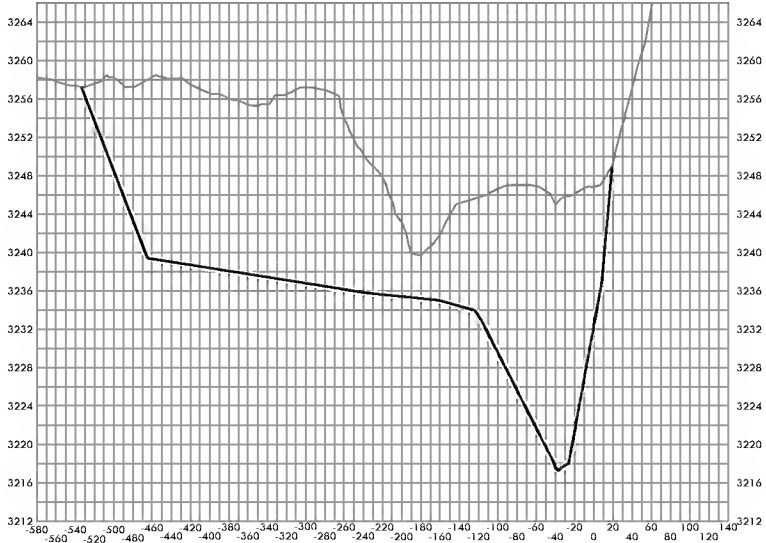
41+00 - VALLEY STA



45+00 - VALLEY STA



50+00 - VALLEY STA



EXISTING GROUND
PROPOSED GROUND

* VIEWING UPSTREAM *
* REFER TO SHEET J-1 FOR PLAN VIEW*



SCALE: 1" = 200' H
SCALE: 1" = 20' V

CFR 1 - VALLEY CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



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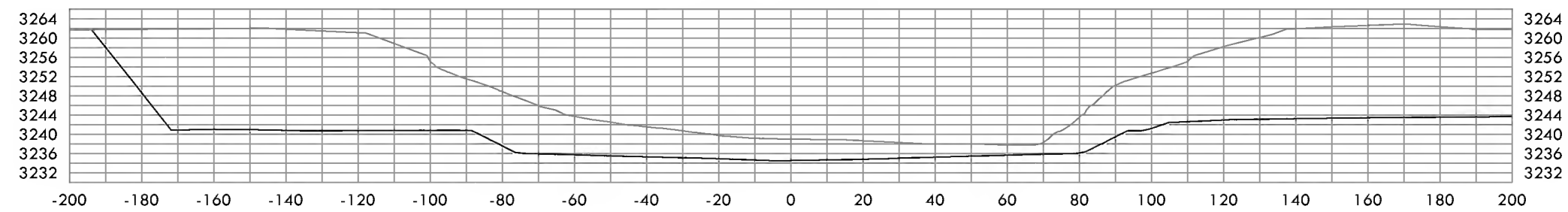


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| 2 | 10-14-05 | KLC | FINAL |
| 1 | 03-29-05 | MSD | DRAFT |
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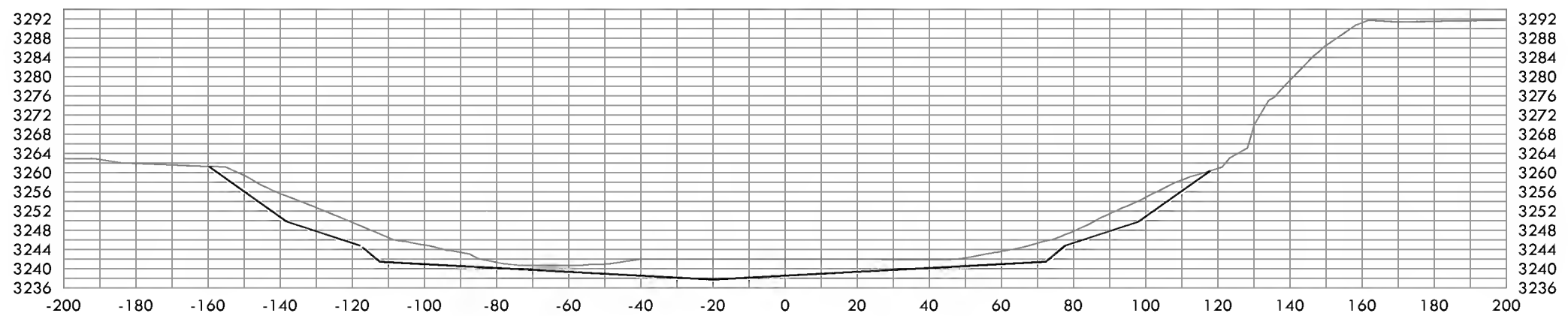
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| DRAWN BY: | NMW |
| DESIGNED BY: | GTD/MSD |
| CHECKED BY: | MSD |
| PROJECT NO.: | RDG-04-018 |

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| SHEET K-10 |
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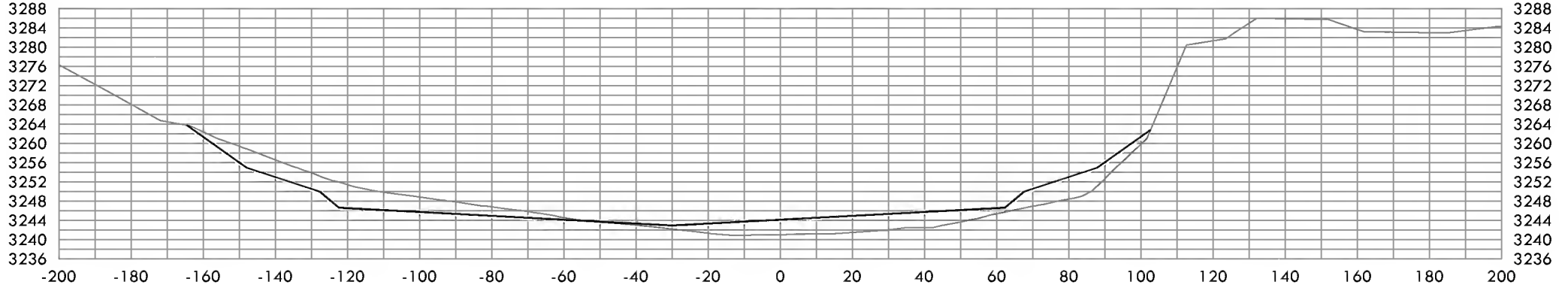
7+00 - BFR STA



20+00 - BFR STA



40+00 - BFR STA



EXISTING GROUND
PROPOSED GROUND

* VIEWING UPSTREAM *
* REFER TO SHEET I-5 FOR PLAN VIEW *



SCALE: 1" = 40' H
SCALE: 1" = 30' V

BFR 1 - VALLEY CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
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| 1 | 03-29-05 | MSD | DRAFT |
| NO. | DATE | BY | REVISION DESCRIPTION |

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|--------------|------------|---------------|-----------------------------|
| DRAWN BY: | NMW | SHEET K-11 | FILE NAME: RDG-11X17.dwg |
| DESIGNED BY: | GTD/MSD | | |
| CHECKED BY: | MSD | | |
| PROJECT NO.: | RDG-04-018 | | |